A Proposal

TO ESTABLISH AND MAINTAIN

ONE UNIFORM SYSTEM

OF

WEIGHTS, MEASURES

AND

COINS,

AMONG ALL CIVILIZED AND COMMERCIAL NATIONS.

"To consult the welfare of the people is the first great law."

BY P. A. BROWNE, LL.D.,

OF PHILADELPHIA.

New-York.

1851.

Digitized by the Internet Archive
in 2017 with funding from
This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

https://archive.org/details/proposaltoestabl00brow

A PROPOSAL TO ESTABLISH AND MAINTAIN

ONE UNIFORM SYSTEM OF WEIGHTS, MEASURES AND COINS

AMONG ALL CIVILIZED AND COMMERCIAL NATIONS.

It is confidently believed, that no circumstance would have such a happy influence upon the social and commercial intercourse of nations, as

ONE UNIFORM SYSTEM OF WEIGHTS, MEASURES AND COINS;

and the author of this paper, availing himself of the opportunity, proposes it to the executive committee of the London Industrial Convention; and by their influence, to the friends of commerce, industry and reform throughout the world.

It is obvious that the simplest transaction of traffic cannot be carried on without some knowledge of *weights* and *measures*, and very little intercourse can be had, with advantage, without the aid of *coins;* yet, in regard to all of them, there exists a paucity of information, and a lamentable want of uniformity, which is calculated, at all times, to create confusion, and often to encourage fraud and imposition. While other branches of knowledge have been rapidly advancing towards perfection, those of weights, measures and coins have remained stationary; science seems to have considered them unworthy of her notice,—while the arts have contributed but little to their improvement. The Rev. Rogers Ruding, the learned author of "Annals of the Coinage of Great Britain," remarks that, "from the time of the eminent artist Simon, to the present, [1840,] (with the exception of that period which is filled with the works of Croker,)* *the art of coining has declined with a rapidity, for which it is not easy to account.*"

The most ancient method of trading was, doubtless, by plain barter: exchanging one article, directly, for another; but even this could not have been extensively prosecuted, without the aid of weights and measures.

Afterwards, some necessary of life became the object of general exchange, as, for instance, "cattle," in the ancient meaning of that word, "pecunia," which now includes both "cattle" and "money." The legal term "chattels," includes all personal property, and it was not until more modern times that domestic animals were exclusively denominated "cattle."

The next step upon the ladder of improvement was, to exchange the metals, *by weight*, for some other useful article. Accordingly, we find Abraham *weighing* to Ephrom the 400 shekels of silver he gave for a burial place in Machpelah. (Gen. xxiii.: 14, 16.) This was 1860 years B. C. So, Joseph, 1727 years B. C., was sold for 20 shekels *in weight* of silver; and his brethren, 1707 years B. C., carried back, in their sacks, the *same weight* of precious metal which they had previously exchanged, in the same manner, for corn. And lastly, in the time of Jeremiah, which

* i. e. The reign of Queen Anne and part of that of George I.

was only 590 years B. C., we find that prophet "*weighing in a balance*" the 17 shekels of silver which he gave for his cousin's field.

Here, then, we perceive that, for 1000 years, bartering with a metallic medium had not got beyond ascertaining its value, by its weight, at every transaction.

The ancient Grecian weights and coins had sometimes the same names; thus plainly pointing back to the time when the uncoined metal was weighed for the purposes of exchange. In fact, we have no certain knowledge of any *coined* money until about 561 years B. C., when Crœsus, the fifth and last of the Mermnadæ who reigned in Lydia, and who was, proverbially, the richest of mankind, coined his *Crœsi.*

We are aware that the point of precedence in coinage is contended for the Lydians, the Æginetans, the Thessalonians, and the Phœnicians, and that some respectable authors say that money was coined in Argos, in 894, B. C.

It was a long time before the Jews made coins. The first mention of theirs, in history, is when Antiochus Sidetus, the 7th King of Syria, granted the privilege to Simon the Maccabee, which, according to some writers, was about the 150th, and, to others, the 139th year B. C. These coins weighed each one shekel, were stamped, in Hebrew, with the words, "*The Shekel of Israel;** they weighed, according to Alexander,† 0.032068 lb., but according to Josephus, they were equal to 4 Attic drachmes; each of which are rated, by Alexander, at 67.38 grains. Specimens of this most ancient coin are said to have been handed down to modern times, and although much worn, they are said to weigh from 215 to 229 grains of Troy.

The first Roman coins of silver are said to have been made about 266 or 269 years B. C., and their first of gold ones, 207 B. C.; but they are represented to have been in common use in Greece in the time of Solon, about 600 years B. C.

The temple of Juno Moneta was the Roman Mint, and the word "moneta," (whence comes our word "money,") referred to the image upon the coin.

The Hebrew weights were the Beka, which, according to Alexander, is 0.016043 lb.; the Gerah,‡ 22.46 grains; the Kichkar, 96.258287 lb.; the Maneh, 1.925166 lb.; the Shekel, 0.032068 lb., and the Talent.

The table of weights, for weighing silver, is as follows—(*See Ap. to Morse's Gazetteer.*)

		lb.	oz.	dwt.	grs.	
20 Gerahs,	=					
Shekel,	=	0	0	9	$2\frac{4}{7}$	Troy
1200 . . . . . 60 . . Maneh§	=	2	3	6	$10\frac{2}{7}$	
3,600,000 . . 3000 . . . . 50 . . Talent	=	113	10	1	$10\frac{2}{7}$	

But the weights for weighing other things than silver were about $\frac{1}{5}$th heavier.

---

* The Hebrew word Shekel is derived from the verb "to *weigh.*"

† Dictionary of Weights and Measures, by J. H. Alexander. Baltimore. 1850.

‡ "Gerah," a grain, the smallest particle of any thing. See Ex. xxx.: 13.

§ But see Ezekiel xlv. 12. "20 shekels, 25 shekels, 15 shekels, shall be your maneh."

We find some of these names of weights in the tables of weights of other countries, but there is a great discrepancy in the denomination; for instance—

The Talanton of the ancient Babylonians is,	96,258,295	lbs.
" of the ancient Egyptians,	57,754,977	"
" of the ancient Greeks,	96,258,295	"
" Attic; before Solon,	80,215,246	"
" " after do.,	57,754,977	"

from which it will be perceived, that one of the evils herein complained of, viz.—the want of uniformity in weights, commenced at a very early period of the world.

The ancient Greek weights were the following :—

BELOW THE DRACHMA.

Lepton, =	0,18	grains.
7 .. Kalkous,	1,40	"
28 .... 4 .... Emiobolion,	5,62	"
56 .... 8 ..... 2 .. Obolos,	18,717	"
112 .. 16 ..... 4 .... 2 Diabolon,	22,46	"
336 .. 48 ..... 12 .... 6 .... 3 Drachme,	112,30	"

ABOVE THE DRACHMA.

Drachme—meaning as much of anything as can be taken up with the fingers. =		
2 Didrakmon, =	0,032,086	lbs.
100 .... 50 .. Mna,		
5,000 .. 3000 .... 60 Tantalon,*	96,258,295	"
1,000 .. 5,000 ... 100 1⅔ Tantalon of Ægina,		

(See the tables of A. B. Conger, based upon the treatise of Wurm and the tables of Bouillet, and the Dict. of Weights and Measures of Alexander.)

The ancient Roman weights are thus represented :—

BELOW THE SICILIQUUS.

	dwt.	grs.	Troy.
Siliqua,	0	2,92	
3 .. Obolus,	.	8,76	
6 .... 2 .. Scrupulum,	.	17,53	
12 .... 4 ..... 2 Semisextula,	1	11,6	
24 .... 8 ..... 4 ..... 2 Sextula,	2	22,13	
36 .... 12 ..... 6 ..... 3 .. 1,5 Siciliquus,	4	9,19	

ABOVE THE SICILIQUUS.

Siciliquus, =	0	0	4	9,19
13 .. Duella,	.	.	5	20,26
4 .... 3 Uncia,	.	.	17	12,79
48 .. 36 .. 12 Libra.†	.	10	10	9,53
4,800 3,600 1,200 100 Centumpodium,	87	7	19	17,06

It is upon the above ancient Grecian and Roman weights that the *present* weights, used throughout the commercial world, have been mainly founded; but with an astonishing variation in their relative values. For

---

* The word means a *balance*. † Libra, a *balance*.

instance, take the ancient Greek drachme, which, as we have seen, is equal to 112.30.

	Grains.
The Drachm (Apothecaries) of England and the U. S. is,..=	60
The Drachma of Aix-la-Chapelle is,.....	56,31
" Berlin,.....	56,40
" Berne,.....	62,71
" Cairo,.....	48,60
" Cologne,.....	56,35
" Dresden,.....	56,29
" Frankfort,.....	60,93
" Germany, generally,.....	57,53
" Greece,.....	59
" Hamburg,.....	58,40
" Hanover,.....	59,03
" Hungary,.....	48,62
" Ionian Isles,.....	47,25
" Leipsic,.....	56,36
" Lübec,.....	58,45
" Morea,.....	46,26
" Mecklenburg,.....	61,27
" Nürnberg,.....	57,53
" Smyrna,.....	49,21
" Tripoli in Africa,.....	48
" Tripoli in Syria,.....	46,73
" Vienna,.....	67,69
" Weimar,.....	56,36
" Wurtemberg,.....	56,38

The same may be said of the ancient Roman Scrupulum.

	Grains.
The Scruple of England and the United States is,.....	20
" Amsterdam,.....	19,781
" Denmark and Holstein,.....	19,177
" Germany, generally,.....	19,177
" Holland,.....	20,096
" Sweden,.....	19,024

This list might be much increased were it necessary.

Before the 18th year of Henry VIII., there was a "*pound*" in England called "the *Tower pound*," lighter than the succeeding "Troy pound" by $\frac{3}{4}$ of an ounce.

The following table of it is found in Ruding's Annals of Coinage:—

$1\frac{1}{3}$	Wheat Corns.			
32	24 ..	Pennyweight,*		
480	20 ..	Ounce.		
5760	240..	12 ..	Pound=5,400 grains Troy.	

The learned have not agreed upon the origin of the word "*Troy*," as distinguishing a series of weights. Some trace it to the ancient city of that name, at whose fairs it is said to have been first seen; others derive it from the mythological name of the city of London; while a third trace it to "*trois*," three, because, as they say, the pound is divided and subdivided into that number of denominations.† The word "pound" originally meant "weight."

* For the manner which "pennyweight" was derived from the weight of a penny, see Adams' Rep. 31.

† See Adams' Rep. 34.

The pound, (lb.) whether of Troy or Avoirdupois, has 5760 grains; and one cubic inch of pure water, (the barometer being 30, and the thermometer 62 Fahr.), is = 252,458.

The Troy weight, as used by goldsmiths since 1527, is divided as follows:—(Before 1527, gold and silver were weighed by the English *Tower* pound of $11\frac{1}{4}$ ounces.)

Grains.				
24	Pennyweights, (dwt.)			
480	20	Ounce, (oz.)		
5760	240	12	Pound, (lb.)	

Troy weight, as used by apothecaries *in retail selling*, (for in both buying and selling *at wholesale*, they use the Avoirdupois weight,) is thus divided:

Grains.				
24	Scruple. (℈.)			
60	3	Drachms, (ʒ.)		
480	24	8	Ounce, (℥.)	
5760	288	96	12	Pound, (lb.)

The following table will show the value of a pound *Troy*, as compared with the pound *Avoirdupois*, in the following places:

The pound Troy in	England and the United States	0,822857	lb.
" "	Scotland	1,088778	
" "	Old Iron	1,429111	
" "	Glasgow Iron	1,406222	
" "	Mint of United States	0,822857	
	Avoirdupois lb	1,	

According to Dr. Young, (who reduced them from Vega,) the following are the discrepancies in the apothecaries' grain, as used by different people:

English	1000	Neapolitan	860
Austrian	1125	Piedmontese	824
Bernese	965	Portuguese	864
French	981	Roman	909
Genoese	850	Spanish	955
German	958	Swedish	955
Hanoverian	978	Venetian	809
Dutch	989		

Troy weight, as used for weighing diamonds and other precious stones, has been, since the 17th century, as follows:

Parts.	
16 Grain	= to 0 $\frac{8}{10}$ of a grain of Troy.
4 Carat	= to $3\frac{1}{5}$ grains of Troy.

The word "carat" is taken from the name of a *bean*, the fruit of an Abyssinian tree called "*Kaura.*"

Avoirdupois weight, sometimes written "haberdupois,"* and anciently averdupois. (Fr.: choses poisable.)

* "Haverdupois"—24 Henry VIII., ch. 3.

Mention of this weight is made in English books in the time of Henry VIII.* It is supposed, by some, that the word is derived from the Romans, "averure," to weigh; and by others, from the French, "*avoir du pois*," to have weight. It was originally used to mean weighable articles.*

The table is as follows:

Drachms.
16 Ounce.
256.....16.....Pound.
7168.....448.....28.....Quarter,
28762....1792.....112.....4....Hundred.
573440...35840.....2240.....80.....20....Tons.

In England the 100 weight for sugar and wax is=108 lbs.
" " wool " 110
" " iron " 120
" " most other things 112

Mr. Adams, speaking of this and similar abuses of language, says—"Of all the tangles of confusion to be unravelled by the regulation of weights and measures, these abuses of language in their nomenclature are perhaps the most inextricable."—(*Rep. of Sec. of State on Weights and Measures*, 1821.)

The following table, containing the comparison of weights of different places, showing the number of pounds of each place that are equal to 100 pounds Avoirdupois, will be appreciated:

One Hundred Pounds Avoirdupois (English) are equal to

91.81	of Amsterdam,	135.59	of Lucca,
96.75	Antwerp,	104.10	Madeira,
112.60	Barcelona,	143.20	Malta,
92.64	Basil,	143.70	Mantua,
91.	Bergen,	111.63	Marseilles,
96.80	Berlin,	141.93	Modena,
86.85	Bern,	113.58	Montpelier,
92.59	Bilboa,	90.79	Morea,
125.31	Bologna,	110.86	Moscow,
91.72	Bordeaux,	80.87	Munich,
90.93	Bremen,	88.94	Nuremberg,
111.90	Breslau,	139.33	Parma,
90.80	Copenhagen,	139.22	Pisa,
112.	Cracow,	88.16	Prague,
103.07	Dantzic,	108.46	Riga,
97.14	Dresden,	133.69	Rome,
133.56	Florence,	91.80	Rotterdam,
97.02	Frankfort,	87.40	Rouen,
93.63	Hamburgh,	110.86	Russia,
93.20	Hanover,	114.29	Sardinia,
119.27	Konigsberg,	98.40	Spain,
133.56	Leghorn,	98.77	Teneriffe,
97.14	Leipsic,	122.93	Turin,
98.80	Lisbon,	96.77	Ulm,
100.	London,	100.	U. S. of America.
93.83	Lubec,	112.20	Warsaw.

* But see Stat. 9 Ed. III. (1335,) and 37 Ed. III. (1353,) and Adams' Rep.

In examining the subject of *measures*, we will find the same difficulties and want of uniformity, and perhaps even more, owing to the circumstance that most of the ancient lineal measures were founded upon comparisons which were, themselves, uncertain.*

The following were the Hebrew long measures, viz., *Digit*—the breadth of a finger. *Palm*—the breadth of four fingers, or of the hand. *Span*—the distance from the end of the thumb to that of the little finger, the hand being extended. *Cubit*—the distance from the elbow to the end of the middle finger.† *Fathom*—the length of the outstretched arms.‡ *Ezekiel's rod—Arabian pole—Scœnus*, or Egyptian measuring line.

The Hebrew itinerary measures were—

Cubit—Stadium—the distance between the pillars at the two ends of the foot-race course at Olympia, which was called the "Stadium."

The *Sabbath days' journey—Parasang* of Persia,§ and the *day's journey*.

The table is as follows :—

Digits.								
4	Palm.							
	3	Span.						
		2	Cubit.					
			4	Fathom.				
				100	Stadia.			
					10	Mile.		
						24 days' journey.		

But these measures, founded upon comparisons with parts of the natural body, were erroneous, because those parts are not sufficiently uniform in different members of the human family.

The ancient Greek measures of length were based upon comparisons of a similar character.

Digit,—finger's breadth ;—Doron,—4 fingers' breadth ;—Lichas.

Orthodoron, the distance from the wrist to the end of the fingers ;—Spithame, from the end of the thumb to that of the little finger, the hand being expanded ;—Pous, the length of the foot ;—Pygme, the distance from the wrist to the elbow ;—Pygon.

Pecus from the elbow to the end of the little finger. Pace or Oryga, the length of the outstretched arms. Stadium, the distance between the pillars of the race-course at Olympia ; which was 600 times the length of the foot of Hercules.

---

* The distance of the outstretched arms is said to be the height, or stature ; the pace, 1-2 of the stature ; the cubit, 1-4 ; the foot, 1-6 ; the span, 1-8. The hand is reckoned 1-3 of the foot, and the breadth of the thumb 1-12. We requested Mr. Jno. G. Meggs, of this city, to ascertain from his book of measures what is the average size of the foot of a male in this city. The measurement of the feet of 300 males amounted to 1970¼ inches ; the average being $9\frac{681}{800}$ inches. The Grecian pous is 9.10, and the Roman pes is 11.64.

† This measure is spoken of before the flood ; but it seems that in after times there were 3 cubits, viz., the cubit of man, 17 inches ; the cubit of the king, 21 inches ; and that of the sanctuary, 35 inches.—(*Adams' Rep.* 16.)

‡ This length was supposed to correspond with the height of the individual, and every body knows how esseutially heights differ in differeut individuals.

§ Parasanga, a Persian measure of roads. Persæ Schœnos et Paragansas, alii alia mensura determinant.—(*Plin.*)

The table of Greek *small* measures of *length*, is as follows :—

	F.	I.
Daktulos,	=0	0,75
2 . Kondulos,	=.	1,51
4 .. 2 Palaiste,	=.	3,03
8 .. 4 .. 2 .. Dikas, (or Doron.) or	=.	6,06
10 .. 5 .. 2.5 1.25 Dikas, (Emipodion.)	=.	7,58
11 .. 5.5 2.75 1.375 1.01 Orthodoron,	=.	8.34
12 .. 6 .. 3 .. 1.5 .. 1.2 .. 1.09 Spithame,	=.	9.10
16 .. 8 .. 4 .. 2 .. 1.6 .. 1.45 .. 1.3 .. Pous,	=1	0.13
18 .. 9 .. 4.5 2.25 1.8 .. 1.63 .. 1.5 .. 1.125 Pugme,	=1	1.65
20 ..10 .. 5 .. 2.5 .. 2 .. 1.81 .. 1.6 .. 1.25 . 1.1 . Punons,	=1	3.17
24 ..12 .. 6 .. 3 .. 2.4 .. 2.18 .. 2 .. 1.5 . 1.3 . 1 D.Pekus	=1	6.20
Pous,	=0 000	1.01
2.5.. Bema,	=.	. 2.52
6 .. 2.5.. Orguia,	=.	2 6.06
10 .. 4 .. 1.6 .. Dekapous, (or Kalamos.)	=.	3 1.11
60 .. 24 .. 10 .. 6 .. Amma,	=.	20 0.68
100 .. 40 .. 16.6 10 1.6 .. Plethron,	=.	33 2.14
600 .. 240 .. 100 .. 60 10 .. 6 .. Stadion,	=.	202 0.87
1200 .. 480 .. 200 120 20 .. 12 .. 2 .. Diaulos,	=.	404 1.75
2400 .. 960 .. 400 240 40 .. 24 .. 4 .. 2 .. Ippikon,	=.	809 0.50
7200 ..2880 .. 1200 .. 720 120 .. 72 .. 12 .. 6 .. 3 Dolikos,	=1	667 1.51

The ancient measures of length among the Romans were :—

Sextula, (the 6th part.)
Siciliquus, (the 4th part.)
Semiuncia, (the one-half.)
Digitus, fingers' breadth.
Uncia, 12th part of anything.
Palmus, the breadth of four fingers.
Pes, the length of the foot.
Palmipes, the length of the foot, and breadth of four fingers added.
Cubitus, the distance from the elbow to the end of the middle finger.
Pes Sestertius.
Passus.
Decempeda.
Actus.
Milliare.

The following is the ancient Roman table of lengths :—

	Inches.
Sextula,	=0.16
1.5 .. Siciliquus,	0.24
3 .. 2 .. Semiunica,	0.48
4.5 .. 3 .. 1.5 .. Digitus,	0.72
6 .. 4 .. 2 .. 1.3 .. Unica,	0.97
18 .. 12 .. 6 .. 4 .. 3 .. Palmus,	2.91
72 .. 48 .. 24 .. 16 .. 12 .. 4 .. Pes,	11.64

	Yds.	Ft.
Pes,	=0	0,97
1.25 .. Palmipes,	.	1,21
1.5 .. 1.2 .. Cubitus,	.	0,45
2.5 .. 2 .. 1.6 .. Pes Sestertius,	.	2,41
5 .. 4 .. 3.3 .. 2 .. Passus	1	1,85
10 .. 8 .. 6.6 .. 4 .. 2 Decempeda,	3	0,70
120 .. 96 .. 80 .. 48 .. 24 .. 12 Actus,	38	2,49
5000 .. 4000 .. 3333 .. 2000 .. 1000 .. 500 .. 41.6 Milliare.	1617	275

These aneient measures of length, being founded upon comparison with certain parts of the body, ought to correspond ; but that they do not, will be perceived by the following table :—

	Scripture Long Measure.	Grecian.	Roman.
Digit,—Digit transversus,	0 in. 912 dec.	0 in. 7554 dec.	0 in. 725 dec.
Palm, Palma minor or Doron,	3 " 648 "	3 " 0218 "	2 " 901 "
Span, or Spithame,	10 " 944 "	9 " 0656 "	1.2 " 505 "
		F.	I.
Pous, or Pes,	" "	1.0 " 0875 "	.11 " 604 "
Cubit, Cubitus, or Pecus,	1.9 " 888 "	1.6 " 1312 "	1.5 " 406 "
Fathom, Pace, Passus, (or Orgya.)	7.3 " 552 "	6.0 " 525 "	4.10 " 02 "
		Yds. F. I.	Yds. F. I.
Stadium,		201 1.7-78	200 4.4-5
Mile, or Milliare,		1612 1.2-24	1161 2.0-0

The lineal measures now in use in commercial countries, having taken their origin from the foregoing aneient long measures, it becomes a curious subject of inquiry, how far they agree ; we select for the experiment, the *foot* measure.

	Foot.
That of England and the United States, is equal to,	1
Amsterdam,	= .930
Antwerp,	= .940
Augsberg,	= .972
Barcelona,	= .992
Berlin	= "
Berne,	= .962
Bologna,	=1.244
Bremen,	= .955
Breslau,	=1.125
Brussels,	= .902
China,	=1.127
Constantinople,	=2.195
Copenhagen	=1.049
Dantzic,	= .923
Dresden,	= .929
Florence,	= .995
Geneva,	=1.119
Hamburg,	= .933
Leghorn,	= .992
Leipsic,	=1.034
Lisbon,	= .952
Madrid,	= .915
Marseilles,	= .841
Moscow,	= .922
Munich,	= .947
Palermo,	= .749
Paris,	=1.066
Prague,	= .987
Riga,	= .933
Rome,	= .960
Stockholm,	=1.073
Turin,	=1.676
Venice,	=1.137

	Foot.
Vienna,	=1.036
Ulm,	= .826
Utrecht,	= .741
Warsaw,	=1.169
Zurich,	= .976

By the preceding table, it is shown, that if any person, residing in London or Philadelphia, was to order *exactly one foot* of any article from each of the above 38 foreign places, he would be surprised to find, upon their arrival, that no two of them agreed in length. We have confined ourselves to *measures of length;* would time admit, it were easy to show that those of *capacity* and *surface* would exhibit similar results.

The Hebrew silver money, copying the names of their weights, were the Gerah—the Bekah—the Shekel—the Maneh, or Mina-Hebrica, and the Talent. The gold coins were the Solidus Aureas, or Sextula—the Shekel of gold, and the Talent of the same metal.

The table is as follows:

	L.	S.	D.
Gerah =	0	0	1
10 Bekah =	0	1	1
20 2 Shekel =	0	2	3
1,200 120 50 Maneh =	5	14	0
60,000 6,000 3,000 60 Talent of silver =	342	3	9

The Solidus was=12*s.*—the Shekel of gold, £1 16*s.* 6*d.*, and the Talent of gold to £5475.

The Grecian coins, in like manner, follow their *weights*, viz.:

BELOW THE DRACHM.

	D.	Cts.	M.
Leptron =	0	00	0.5
7 Kalkous =	.	.	3.6
14 2 Dikalkon =	.	.	7.3
28 4 2 Emiobolion =	.	1	4.6
56 8 4 2 Obolos =	.	2	9.3
112 16 8 4 2 Diobolon =	.	5	8.6
224 32 16 8 4 2 Tetrobolon =	.	11	7.2
336 48 24 12 6 3 1.5 Drakme. =	.	17	5.9

ABOVE THE DRACHM.

Drakme =	.	17	5.9
2 Didrakmon =	.	35	1.8
4 2 Tetradrackmon =	.	70	3.7
20 10 5 Krusous =	3	51	8.6
100 50 25 5 Mna =	17	59	3.2
6,000 3,000 1,500 300 60 Faltulon (of Silver.) =	1055	59	3.2
60,000 30,000 15,000 3,000 600 10 Tantalon (of Gold.) =	10555	93	2.6

The ancient Romans reckoned their *copper* money by asses,*—their silver money by sestertii, and their gold money by the Attic talent. Servius Tullius was the first who caused money to be coined by stamping on brass the image of *cattle.*

The Ass was originally *one pound weight*, but it gradually diminished

---

* Des. brass.

to $\frac{1}{24}$ of a lb. It was divided into 12 equal parts, called "Uneiæ," whence comes our "*ounce.*"

The Sestertuus, or sesteree, was equal to $2\frac{1}{2}$ asses.

The Aureus of gold was equal to 100 sesterees.

The Talent was variously estimated from 860 to 1020 of our dollars.

The following is the table of ancient Roman money :—

											D.	C.	M.
Teruncius,											=0	0	3 87
2	Sembella,										=.	.	7.74
4 ..	2	Assipondium, (as Libella.)									=.	1	5.48
8 ..	4 ..	2	Dupondius,								=.	3	0.95
10 ..	5 ..	2.5 ..	1.25	Sestertius,*							=.	3	8,68
20 ..	10 ..	5 ..	2.5 ..	2	Quinarius, (or Victoriatus.)						=.	7	7.38
40 ..	20 ..	10 ..	5 ..	4 ..	2	Denarius,†					=.	15	4.76
1000 ..	500 ..	250 ..	125 ..	100 ..	50 ..	25	Aureus (or Solidus.)				=3	86	8.46

To learn the *names* only of the coins current in the world (not to mention their denomination), is an onerous tax upon the memory; and, since the rapid mode of traveling by rail-roads has been introduced, wayfarers are obliged to change their money with the progress of days, and even of hours, or they are unable to keep pace with the currency.

Paucton (Metrology, p. 8) says, that standards of weights and measures were established in Egypt at a very remote period; that the side of their largest pyramid was a standard measure, being the 500th part of a degree of the meridian, which had been previously measured.

There were two kinds of shekel weights among the ancient Hebrews, one "of the sanctuary," as it was called, (see *Ex.* xxx. 13,) and the other called "the king's," (see 2 *Sam.* xiv. 26.) It is believed that the former was the *standard.* (See *Ex.* xxx. 13; *Lev.* v. 15 and xxvii. 3, 6.)

There is a fixed weight for each individual coin issued in civilized countries, which is denominated the *standard weight;* and from the great intrinsic value of the materials generally used for the manufacture of money, and the necessity of mixing these materials with others of less value, in order to ensure their preservation, there is another *standard*, viz., that of *fineness.*

We are informed that there was a mint at Athens, where money was coined; here were kept the standard weights for their various coins. The Temple of Juno Moneta was the Roman mint. The term "moneta" (whence comes our word "*money*") referred to the image upon the coin.

The ancient Romans, also, carefully preserved standards of *measure.* Among the articles with the Ruins of Pompeii are steel-yards and scales with weights. One of the former has stamped upon it—

IMP. VESP. AVC. IIX.
T. IMP. AVC. F. VI. C.
EXACTA. IM. CAPITO.‡

Many laudable attempts have been made in England to erect and maintain standards of weights, measures, and coins. So early as Magna

---

* $2\frac{1}{2}$ Denarius. † Pieces of 10.

‡ In the 8th Consulate of Vespasian, Emperor Augustus, and in the 6th of Titus, Emperor and son of Augustus. *Proved in the Capitol.*

Charta (1215), it was one of the concessions to the grievances of the subject, that "*there should be one weight and one measure throughout the land.*" This declaration is repeated in several subsequent statutes.

There was a standard *weight* prescribed by a statute of 51st Henry III. (1267), which was an English penny, called "the *sterling*,"* which was to be round, without clipping, and whose weight was 32 grains of wheat, well dried, gathered out of the middle of the ear; and 20 pence was to make an ounce, and 12 ounces a pound.

Writers of the fifteenth century speak of *fixed measures* of length, founded upon a *standard* of 3 barley-corns; and, as these measures appear to have been introduced, generally, into Europe, in the sixteenth century, we may as well give the following tables:

3 Barley-Corns.
4 Digit.
4 Palm.
1½ Foot.
Cubit.
10 palms, or 2½ feet, one step (gressus.)
2 steps, or 5 feet, one pace (passus.)
10 feet, one perch.
125 feet, one Italian Stadium.
5 Stadia, or 1000 paces, one Italian mile.
4 Italian miles one German mile.
5 Italian miles one Swiss mile.

The "*yard*" (yeard) is of Saxon origin, having been originally the circumference or girth of the body. The modern yard was fixed by Henry I., from the length of his arms. The old French foot was, doubtless, called "poid de roi," for a similar reason.

One can hardly suppress a smile at the long and learned (?) discussions in the old books, upon the *kind* of barley-corns, whether they should be grown in the same country, soil, &c., whether they must be placed side by side or end for end, in making the digit.

The British standards of weights and measures have been, from time immemorial, kept in the Exchequer, from which certified copies are furnished; one of these is lodged at Guildhall, for the use of the Founders' Company, to enable them to manufacture weights and measures for the city and those who should desire to buy them; another is kept in the Tower, for the use of the Ordnance officers. Two of these ancient measures were square rods of brass, marked "E," one called "*a yard*" and the other "*an ell*," both supposed to be placed there in the time of Queen Elizabeth, say 1601; the third is marked "H," was never known to be used as a standard, and is supposed to have been deposited in the reign of Henry VII.

The character of these standards may be best judged of by the following description of the *yard*, given by an eye-witness, Mr. F. Bailey, F. R. S., and one of the Vice-Presidents of the Royal Astronomical Society of London, in an elaborate report upon weights and measures, made to that society, and published by them in the 9th volume of their Memoirs, p. 146.

---

* Sterling from "Easterling"—*Ruding.*

"I had an opportunity of seeing this curious instrument, of which it is impossible, at the present day (1835) to speak too much in derision or contempt. A common kitchen poker, filed at the ends in the rudest manner, by the most bungling workman, would make as good a standard. It has been broken asunder; and the two pieces have been dovetailed together, but so badly done that the joint is nearly as loose as that of a pair of tongs. The date of this fracture I could not ascertain, it having occurred beyond the memory or knowledge of any of the officers of the Exchequer. And yet, 'till within the last ten years, to the disgrace of this country, copies of this measure have been circulated all over Europe and America, with a parchment document accompanying them, (charged with a stamp, that costs £3 10s. exclusive of office fees,) certifying that they are *copies of the English Standard.*"

In 1742 the Royal Society of London and the Academy of Sciences at Paris held some correspondence on the subject of weights and measures, when Mr. Graham, at the instance of the former institution, made on two brass rods copies of the standard yard at the Tower; one of these was deposited in the archives of the Royal Society, and the other was sent to the Academy of Sciences at Paris. The next year Mr. Graham compared the Royal Society's copy of the Tower standard with the original in the Exchequer, and also with the one at Guildhall, and *did not find any two of them agree.*

In 1758 a committee was appointed by the House of Commons to investigate the subject of weights and measures. This committee employed Mr. Bird, who made a copy of Mr. Graham's copy of the standard yard, in the possession of the Royal Society of London. This was marked, "Bird's standard yard of 1758," and was, by the committee, lodged with the Speaker of the House of Commons. It is thus described by Mr. Bailey:

"Bird's standard yard of 1758 was a solid brass bar of 1.01 inch square and 36.06 inches long; about 1½ inch from the end a gold stud is inserted, in which, at the distance of 36 inches, *are two large holes, intended to designate the length of the yard. These holes were, probably, originally points, but by great carelessness, had enlarged so as to make it difficult to ascertain the original centres.*"

It is true that the committee report that they compared this Bird's standard of 1758 with the standard yard in the Exchequer, and with the copy made by Mr. Graham for the Royal Society of the Tower standard, and that *they found them to agree;* but that this must have been a mistake is certain; for as before stated, the Exchequer yard and the copy by Mr. Graham of the Tower measure *do not agree.* The committee recommended Bird's measure of 1758 as "the Parliamentary Standard."

In 1759 another committee was appointed by the House of Commons, who had a copy made of Bird's standard of 1758, which they deposited with the Speaker of the House of Commons. It was marked, "Bird's standard of 1760." It was similar, in form, to the one of 1758; but the holes were still larger and more irregular, and consequently the centre more difficult to ascertain. This committee concurred with the one of 1759, in recommending Bird's measure of 1759 as the national standard. The Commons agreed to these reports, but further action was postponed until 1765, when two bills were reported, but neither of them passed.

In 1814 the House of Commons took up the subject anew, and a committee, by them appointed, again recommended Bird's measure of 1759 as the unit measure of the kingdom; but nothing further was then done.

In 1819 the Prince Regent appointed a commission of learned men, who made three very interesting reports in 1819, 1820 and 1821, respectively. In the first of these they recommended, as the Parliamentary standard, the measure used by General Roy, in the measurement of a base at Hounslow Heath. In the second they recommended the standard of Bird of 1760;—the third made no specification.

In 1821 the House of Commons appointed another committee, to whom all the above mentioned reports of the commissioners were submitted. In 1823 a bill was reported, which, in 1824, resulted in the Act of 5 Geo. IV., chap. 74, adopting the scale of Bird of 1760, "as the original and genuine imperial standard yard of Great Britain, and the only unit standard measure of extension."

Of this standard Mr. Bailey remarks, that it had never been compared with the standard yard kept in the Exchequer, from which it materially differed, being well known to have exceeded it in length nearly $\frac{1}{140}$ of an inch; and moreover, that the experiments made by the commissioners were of a *very coarse nature.*

A month after the passage of the Act of Parliament of 1824, another was passed, delaying the time of its going into operation to 1826.

In 1834 both houses of Parliament were burned, and the Bird standard of 1759 and 1760 were entirely destroyed.

The Act of 1824 provides, that in case the imperial standards shall ever be lost or destroyed, *it shall be renewed and restored by a new one bearing the same proportions to the pendulum;* yet the results obtained by the Commissions appointed by the Prince Regent, who reported the adoption of that standard, *are confidently asserted not strictly correct;* nor has it been ascertained that a pendulum in London, vibrating seconds, bears the proportion to that imperial standard which they, the Commissioners, have stated. (See the report of Mr. Bailey to the Royal Astronomical Society of London, published in the 9th volume of their Memoirs, pages 146 and 147.)*

We will conclude what we have to say upon the British standards, with the notice of what some may think not the least extraordinary circumstance in its brief history, viz., that in 1835 Parliament passed the Act of 5 and 6 Wm. IV, ch. 63, in which the above-mentioned imperial standards of Bird, of 1759 and 1760, are referred to, *as if they were still in existence*, and they are quoted as authorities to be appealed to on every occasion, as if they had not been burned the previous year, (1834), as we have before mentioned.

The standard of measure, according to the new French system, was adopted in 1795, but did not go into operation until some years afterwards; it consists of a meridional circle of the earth, which, for this purpose, has been accurately ascertained by men of science. The whole circle is divided into 40 million parts, or the quadrant into 10 million parts, one of which is the unity of length, called a metre. In order to express decimal proportions in this new system, the following terms have been adopted. The term Deca prefixed, denotes 10 times; Heca, 100 times; Chilo, 1000 times; and Myrio, 10,000 times. On the other hand, Deci expresses the 10th part; Centi the 100th part; and Milli the 1000th

* The Pendulum cannot serve to find the measure of a yard, because there is no aliquot part between the two lengths.—*Hassler.*

part: so that Decametre signifies 10 metres; the Decimetre the 10th part of a metre; &c. The Metre is the element of long measures; Arc, that of square measures; the Litre is the element of all measures of capacity; and the Gramme, which is the weight of a cubic centimetre of distilled water, is the element for all weights. For bulky articles, like wood, the Stere is the unity of measure. It is equal to a cubic metre, containing 35.3171 cubic feet, English. This system, according to Mr. Adams, is founded upon the following principles, viz.:

1st. That all weights and measures should be reduced to one *uniform* standard of linear measure.

2d. That this standard should be an aliquot part of the circumference of the globe.

3d. That the unit of linear measure, applied to matter, in its three modes of extension, length, breadth, and thickness, should be the standard of all measures of length, surface, and solidity.

4th. That the cubic contents of the linear measure, in distilled water, at the temperature of its greatest contraction, should furnish at once the standard weight and measure of capacity.

5th. That for every thing susceptible of being measured or weighed, there should be only one measure of length, one weight, one measure of contents, with their multiples and sub-divisions exclusively in decimal proportions.

6th. That the principle of decimal division, and a proportion to the linear standard, should be annexed to the coins of gold, silver, and copper; to the moneys of account; to the division of *time;* to the barometer and thermometer; to the plummet and log lines of the sea; to the geography of the earth and the astronomy of the skies; and, finally, to every thing in human existence susceptible of comparative estimation by weight or measure.

7th. That the whole system should be equally suitable to the use of all mankind.

8th. That every weight and every measure should be designated by an appropriate, significant, characteristic name, applied exclusively to itself. (See Adams' Rep., pp. 47 and 48.)

The 3d of March, 1817, the Senate of the United States resolved, that the Secretary of State be requested to prepare a report upon weights and measures, &c.

On the 22d of February, 1821, the Hon. John Q. Adams made an elaborate report, in which, among other things, he recommeuded to Congress:

1. To declare what were all the weights and measures to which the laws of the United States refer, as the legal weights and measures of the Union.

2d. To procure positive standards of brass, copper, or such other materials as may be deemed advisable, of the yard, bushel, wine and beer gallons, Troy and Avoirdupois weights; to be deposited in such public office, at the seat of government, as may be thought most suitable.

3d. To furnish the Executive authorities of every State and Territory with exact duplicates of the national standards deposited at the seat of government.

4th. To require, under suitable penal sections, that the weights and measures used at all the Custom Houses, Land Surveys, and Post Offices,

and, generally, by all offices under the authority of the United States, in the execution of their laws, should be conformable to the national standards.

5th. To declare it penal to make or use, with intent to defraud, any other weights and measures than such as shall be conformable to the standards.

Mr. Adams remarks, that for the purposes of the law, it will be sufficient to declare that the English foot, being $\frac{1}{3}$d of the standard yard of 1601, in the Exchequer of Great Britain, is the standard unit of the measures and weights of the United States. That, for the purpose of uniformity, it would be desirable to obtain a copy, as exact as the most accomplished art could make it, of the standard yard of 1601, in the Exchequer of Great Britain, made of the same material, brass, but divided with all practicable accuracy into three feet and 36 inches, and each inch further divided into 10th and 100th parts; the rod, with the words "standard yard measure of the United States, 3 feet—36 inches," and the date of the year engraved on one of its sides, should be enclosed in a wooden case, and deposited for safe keeping in one of the offices at the capitol. From the foot measure of this yard the standard bushel and two gallons should be made.

Little did Mr. Adams think, when he made all these provisions for obtaining and preserving this standard of the Exchequer of Great Britain, that, to use the words of Mr. Bailey, "a common kitchen poker, filed at the ends in the rudest manner, by the most bungling workman, would make as good a standard." That, "it had been broken asunder and the two pieces dovetailed together, but so badly that the joint is nearly as loose as that of a pair of tongs." "That the date of this fracture could not be ascertained, it having occurred beyond the memory or knowledge of any of the officers of the Exchequer, and yet, (as Mr. Bailey remarks,) to the disgrace of that country, copies of that measure had been circulated all over Europe and America, with a parchment document accompanying them, (charged with a stamp which costs £3 10s., exclusive of official fees,) certifying that they were true copies of the *English standard.*"

In May, 1830, the Senate resolved, that the Secretary of the Treasury cause an examination of the weights and measures used at the different Custom Houses, examined, and in the month of January, 1832, Mr. Ferdinand Rodolph Hassler made a report, recommending a set of new standards to be made and distributed.

The 16th June, 1836, Congress resolved, that the Secretary of the Treasury should send a complete set of weights and measures to the Governor of each State and Territory, to the end that an uniform standard of weights and measures might be established throughout the United States.

Many of the numerous inconveniences and losses, arising out of the uncertain state of trade and intercourse, pointed out in this paper, might easily be remedied, by adopting and preserving throughout the civilized and commercial world

ONE UNIFORM SYSTEM OF WEIGHTS, MEASURES AND COINS.

Sizes are determined in three ways: 1st, by mere *length*, that is to say, by *one dimension only;* 2nd, by *surface*, which is length multiplied by breadth,—having two dimensions; and 3rd, *solidity* and *capacity*, which

has length, breadth, and height or depth, and which consequently has three dimensions. The last being generally denominated "cubic measure," (from *Kubos*, a solid body consisting of six equal sides,) is dependent for its measurement upon the first and second; and, inasmuch as from *solidity* arises *weight*,—and it is by *weight* that the value of all coins, of equal purity, must be determined—it follows, that in order to form and sustain an uniform system of weights, measures and coins, what is wanting is, to fix upon *an accurate standard of linear measurement.*

What I propose, then, is: that the government of every nation represented at the World's Fair, shall be requested to appoint a competent agent, all of whom to meet at some convenient time and central place, then and there to discuss and adjust this important preliminary to fair and honorable trade and social intercourse between their citizens and subjects.

Let this grand committee, after mature deliberation, fix upon *one certain standard measure of length*, to be thereafter adopted and used in all countries. Let this standard measure of length be the criterion of the extent of all capacities, and (subject to variations in metallic purity, and the fluctuations of exchange,) the index of the value of all coins.

In this age of light and knowledge, when religion, charity and tolerance are every where encouraged,—when the benign principles of liberty and equality of rights are flowing over the four quarters of the globe,—when commerce, regulated by the sound maxims of honesty, is extending from pole to pole,—when social intercourse between man and man, and between nation and nation, is gradually taking place of war, invasion and conquest,—when, by the magic power of steam, time and distance are annihilated, and people of unknown tongues are suddenly and unexpectedly brought face to face,—when the inhabitants of remote places are whispering their thoughts to each other with the speed of lightning,—the improvements here suggested, and they alone, seem wanting to unite all mankind in *one nation*,—*one people*,—*one happy family.*

"Esto." "Esto perpetua."